DOCUMENT RESUME

ED 092 242 PS 007 351

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TITLE	Psychological Perspectives and Early Childhood Education: Some Relations Between Theory and Practice.
INSTITUTION	ERIC Clearinghouse on Early Childhood Education, Urbana, Ill.
SPONS AGENCY	National Inst. of Education (DHEW), Washington, D.C.
PUB DATE	74
NOTE	47p.; An earlier version of this paper was presented at the meetings of the Society for Research in Child Development (Philadelphia, Pennsylvania, March, 1973)
AVAILABLE FROM	Margery B. Franklin, Department of Psychology, Sarah Lawrence College, Bronxville, NY 10728
EDRS PRICE	MF-$0.75 HC-$1.85 PLUS POSTAGE
DESCRIPTORS	Cognitive Development; Developmental Psychology; *Early Childhood Education; Educational Objectives; *Educational Theories; Interaction Process Analysis; Models; *Program Descriptions; *Program Evaluation; *Psychoeducational Processes; Social Development

ABSTRACT

The aim of this paper is to delineate some of the central issues confronting psychologists and educators in the application of psychological theory and research to early childhood education. Three approaches to early childhood programming are presented: the behavioristic-learning theory perspective, the Piagetian cognitive-developmental, and the developmental-interaction approach. The differing assumptions on which they are based, the differing ways in which they draw on and utilize psychological concepts, and the ways in which they therefore involve young children in qualitatively different encounters with people, problems and ideas in the school setting are examined and critically evaluated. The final section of the paper is concerned with a summary statement of the issues arising in the discussion of the three approaches to early childhood education, including a consideration of some of the problems that must be confronted in the task of evaluating effects of differing modes of education. (Author/CS)

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Psychological Perspectives and Early Childhood Education: Some Relations Between Theory and Practice[1]

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Introduction

The aim of this paper is to delineate some of the central issues that confront us, as psychologists and educators, in this period of accelerated application of psychological theory and research to early childhood education.

In the past decade we have seen a rapid growth of programs in early childhood education. Many have arisen as part of an awakened sense of social responsibility, especially the recognition of the urgent need to deal with the plight of children from poor and minority group populations. Some have arisen in response to the demands of the middle-class families, especially those where mothers work, for increased care and/or tutelage for their preschool children. Others have developed to serve primarily as "laboratories" for study of the initial stages of development. Though differing in purpose and pattern, these programs have in common the conviction that the child's experience during the early years has important and enduring effects on his subsequent development, in fact, on all his transactions in the world of people and ideas.

The sources of underlying conceptualizations are many and diverse, but it is clear that a significant proportion reflect the direct impact of interest and effort on the part of curriculum developers who draw heavily on aspects of theory and/or research in child development (cf. Parker and Day, 1972). While some programs are eclectic, drawing on an assortment of theoretical percepts, others are

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1. An earlier version of this paper entitled "Issues in the Relation of Psychology to Early Childhood Education" was presented at the President's Symposium, "Interactions Among Theory, Research and Application in Child Development" at the meetings of the Society for Research in Child Development, Philadelphia, March 1973. Requests for reprints should be sent to Margery B. Franklin, Department of Psychology, Sarah Lawrence College, Bronxville, N.Y. 10728.

based, more or less rigorously, on theory-specific concepts about the nature of psychological development and related appropriate methods of education. Some programs are comprehensive in nature, encompassing the totality of experience and relationships that are planned and provided. Others are circumscribed components inserted into the matrix of a general program. In almost all corners, however, we see a more and more widespread effort to bring the concepts and findings from the academic discipline of child psychology to bear on the education of young children.

The complexities of interrelations between psychological theories and educational ideologies, between the findings of research and the implementation of specific goals in practice are indeed awesome. A number of recent books and articles (Kohlberg and Mayer, 1972; Sigel, 1972a; Mayer, 1971; Fein and Clark-Stewart, 1973) reflect an intensified effort to come to grips with the intracacies of these complex interrelationships. There is, for example, increasing recognition of the question of values inherent in the establishment of any educational program as well as greater awareness of the socio-political implications of intervention programs, originally designed to provide "compensatory" education for children of so-called disadvantaged backgrounds (cf. Bronfenbrenner, 1974; Sigel, 1973). This heightened awareness, expressed in the self-critical reflection evident in the current writings of psychologists and educators stems, in part, no doubt from the fact that many of the innovative programs in education failed to achieve their stated goals in the time allotted (cf. Ford Foundation, 1972). But another factor, with more positive implications for the future, is the increased interchange between psychologist program-developers and educational practitioners that necessarily occurred as more psychologists moved into the heretofore unfamiliar territory of the school and more educators consciously sought psychological-theory bases for curricular planning.

On the contemporary scene we see a diversity of programs reflecting the influence of differing psychological viewpoints. We see, also, in the past five or six years, a changing attitude toward the evaluation of outcomes of differing educational programs, a growing mood to re-examine the earlier assumptions and techniques underlying evaluative procedures. The programs included in the Planned Variation Experiment for Head Start and in Project Follow Through provide an extraordinary opportunity to observe the linkage of underlying values, theoretical suppositions, educational goals and methods of implementation that characterize widely divergent programs in early child education (for example, Maccoby and Zellner, 1970; Bissell, 1973; Fein and Clark-Stewart, 1973).

In this paper we shall focus on three central currents in the field, undertaking to clarify the differing assumptions on which they are based, the differing ways in which they draw on and utilize psychological concepts, and on the ways in which they therefore involve young children in qualitatively different encounters with people, problems and ideas in the school setting. We begin by looking at two approaches to early childhood programming which are based quite explicitly on two divergent psychological perspectives: the behavioristic-learning-theory perspective and the Piagetian cognitive-developmental perspective. For our third case we examine in somewhat greater detail a long-established program design recently designated as the developmental-interaction approach (Shapiro and Biber, 1972). From the perspective of psychological theory this approach represents an integration of cognitive-developmental stage concepts and ego psychology formulations. In the case of the developmental-interaction approach theory has an important place as a basic rationale for practice, but essential elements of this educational design have roots in the progressive education ideology of the John Dewey period.

The final section of the paper is concerned with a summary statement of the issues arising in our discussion of these three central approaches to early childhood education, including a consideration of some of the problems that must be confronted in the task of evaluating effects of differing modes of education.

At the outset we may say that we do not claim to approach our task here as neutrals, as impartial observers or disinterested bystanders who are simply reporting on the current scene. We speak from the perspective of developmental-interactionists but we have attempted to present alternative views in their own terms.

The Behavioristic-Learning Theory Approach

A growing number of programs in early childhood education reflect the direct impact of contemporary behavioristic psychology. These approaches share in common the idea that many basic concepts of other psychologies--concepts like "cognitive structure," "underlying motivation," etc.--are not only vague but superfluous, and may be counter-productive in the context of education where one is presumably directed towards effecting behavior change in an efficient manner. At the core of all behavioristic psychologies lie the precepts that (a) observable behavior or performance constitutes the primary datum for the scientific investigation of learning processes and for approaches to behavior change, and (b) the basic principles of learning are the laws of classical and operant conditioning.[2] In the behavior modification movement, which appears to be the strongest among behavioristically-oriented approaches to educational programming, emphasis has

2. Kanfer (1973) discusses four "models" of learning within the behavioristic framework, two of which--"modeling or vicarious learning" and "self regulation"--do not involve the direct application of conditioning procedures. While some of the methods currently employed by behavior modifiers cannot be directly derived from the position of any given behaviorist psychologist, it is nonetheless the case that all are variations on a basic theme and rest on commonly held assumptions.

fallen on the use of operant conditioning techniques as developed in Skinner's work.[3]

The aim of behavior modification is to achieve measurable changes in observable behavior. At base, this consists in arranging or planning an environment in which the individual will come to produce what are designated as "appropriate responses" or "desirable behaviors," and not persist in producing inappropriate or undesirable responses/behaviors. What an individual does--that is, what behavior he engages in, what responses he will come to emit under given circumstances--depends on the consequences of his behavior. Some consequences serve to increase the probability of occurrence of a given behavior, while others serve to diminsh it. By definition, "positive reinforcers" are those events which, occurring after a response, increase the probability of the response: "negative reinforcers" are those consequents which diminish it. Theoretically, only careful observation can determine what constitute positive and/or negative reinforcers for a given behavior of a given individual. In practice, however, there is a tendency to assume--prior to such careful observation--that certain occurrences are generally reinforcing and that others are not. For example, the widespread use of M&M candies as a reward for behavior designated desirable by the trainer is based on the assumption that most young children are very fond of candy.[4] Typically, the "shaping of appropriate behavior" consists in bringing a response or behavior "under the control" of a

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3. While Skinner does not want to be regarded as the father of a "theory," the arguments propounded by Reese and Overton (1970), Kohlberg and Mayer (1972), and others, support our view that the "functional analysis of behavior" espoused by Skinner, and the behavior modification approach in general, are firmly tied to an underlying model/theory of psychological functioning and development--and as such are not merely "methods" for the analysis of behavior.

4. Note that unlike some other behaviorist psychologists, the Skinnerian approach does not link the notion of reinforcement to primary or secondary drive reduction.

given stimulus or category of stimuli; that is, in getting the person to produce the response when a given stimulus is present and not to produce it when the stimulus is not present or when some other stimulus is present. This is achieved through providing reinforcement when, and only when, the response is produced under specified circumstances. Some of the specific techniques employed have been well described by Ackerman (1972).

In the view of behavior-modifiers oriented towards educational programming, any attempt to change or modify behavior in the classroom (which encompasses not only the eradication of "problems" but the process of education in toto) requires: (a) analysis of the present situation in behavioristic terms, (b) specification of the desired behavior changes, and (c) specification of the techniques appropriate to their realization. In line with their conviction that any program must be based on empirically demonstrated "facts" concerning the efficacy of given techniques, psychologists who advocate the use of behavior modification techniques in the classroom have done a considerable amount of research to validate their claim that the principles of learning derived from Skinnerian studies of pigeons and rats in laboratory settings are applicable to the analysis and modification of classroom behavior. Becker (1973), for example, reviews a number of studies which were designed to show the effects of regulated delivery of social reinforcement. In a typical study, an aggressive and disruptive child was observed first for a period of days during which teachers simply maintained their "ongoing pattern of responding." Then, there was a period of seven days in which "the teachers showered Martha with social reinforcement and desirable material goods" (p. 81), giving her a great deal of attention and affection. During the third phase of the experiment, only Martha's specifically and overtly cooperative behavior was followed by the delivery of social reinforcement. It was in this phase of "contingent reinforcement" and not in the preceding phase that there was a progressive increase in the

frequency of Martha's cooperative play. When non-contingent reinforcement was again instituted (as in the second phase), the frequency of cooperative play dropped. These findings are typical of those used to support the position that it is not the creation of a generally warm, accepting, supportive, etc., environment that leads to positive behavior change, but only the planned and systematic administration of reinforcement on a contingency basis (i.e., if and only if the child performs behavior X, does he get reinforcement).

Among programs resting on behavioristic precepts are those of Bereiter and Engelmann (1966), Engelmann and Becker (cf. Maccoby and Zellner, 1970), and Bushell 1973). While not rigorously following a specific behavioristic paradigm, Bereiter and Engelmann drew heavily upon the precepts of behaviorism in developing specific teaching techniques for their "academic preschool." More recently, Engelmann and Becker have been sponsors of one of the models for Project Follow-Through which in a similar way is based on behavioristic thinking.

Bushell's Behavior Analysis Program (1973)--another of the Follow Through models--represents a systematic attempt to apply contemporary behavior modification methods to classroom programming and management. Like all behavioristically-based programs, Bushell's program involves the systematic, regulated administration of reinforcement as the principle means for teaching children the behaviors considered requisite for success in school. The behaviors at issue encompass a wide range--from appropriate social behavior in the classroom to the acquisition of specific academic skills. As in other such programs, positive reinforcers include candy or other snacks, access to favorite toys, access to favorite activities such as art, recess, and/or listening to stories. And when there is adequate basis for considering it a positive reinforcer, the teacher's attention, or more specifically the teacher's expression of praise, is utilized as a means of controlling behavior (i.e., teacher's praise is a social reinforcer, its delivery contingent on the child's producing an appropriate behavior). Withholding of such reinforcers is

the primary means of reducing and ultimately eradicating those behaviors designated as undesirable. For example, the withholding of praise is used as a controlling technique when the teacher, noticing that one child is being inattentive, gives emphatic praise to another child who is paying attention. An important feature of Bushell's program is the establishment in some classrooms of a "token economy" where children earn tokens for designated behaviors; these tokens can subsequently be exchanged for desired goods or the privilege of engaging in a desired activity. In Bushell's program, tokens may also be used to buy the right to indulge for a short period of time in undesirable behavior (1968).[5]

Considering the principles of behavioristic psychology as a basis for educational programming involves coming to grips with several related questions. One question, raised by behaviorists themselves, concerns the efficacy of specific procedures for achieving a circumscribed end-result (a given behavior or set of behaviors). As we have said, the argument for the efficacy of behavior modification techniques in classroom settings is buttressed by reference to studies designed to demonstrate that the regulation of reinforcement (i.e., the establishment of reinforcement contingencies) is effective in bringing about observable and measurable behavior change. And, indeed, many of the studies cited in the context of such argument provide strong evidence that aspects of observable behavior can be regulated through such procedures. However, behavioristically-inclined educators show increasing concern with (a) the extent to which a given learned behavior generalizes to situations other than the one in which original training occurred, and (b) whether continuing production of the desired behavior is contingent upon the continued administration of a given reinforcer. This ties into the question

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5. Krasner and Krasner (1973) have discussed some of the specific procedures involved in establishing token economies in classroom settings, and review a number of studies aimed at assessing the efficacy of such procedures.

of "durability" of behavior change, and to the possibility of "fading out" reinforcers such as candy and toys in preference to social reinforcers such as praise, and perhaps ultimately in preference to self-administered reinforcers (e.g., "Gee, I'm a good kid for doing that!"). On these issues--generalization or transfer, durability, and the substitution of less tangible for more tangible rewards--evidence is not so conclusive (cf. Scriven, 1973). In other words, it is not clear that behavior modification techniques produce behavior changes which transfer readily to new situations and which can be maintained without the regular administration of tangible rewards. Most behavior-modifer-educationalists see these as technical problems to be overcome through improvements in training methods.[6]

At this point, it is important to point out that behavior modification is viewed by its proponents as a technology; in the context of education, it is aimed at getting the child to perform in whatever ways the program-developer (often a psychologist) considers beneficial, desirable, educationally worthwhile. It is maintained that behavior modification can be put to any one of a variety of uses, geared towards the realization of any educational objective which is stated with sufficient precision and explicitness. This is, of course, consonant with Skinner's contention that on the level of social planning, the techniques of operant conditioning can be as readily used to create a Utopia (namely, Walden Two) as a fascistic state. The technology is purportedly value-free. It is clear, however, that as soon as technology is applied, decisions are being made which involve levels of value judgments. In current discussion among behavior modifiers over the use of punishment, the focus is on efficacy; many maintain that if punishment techniques

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6. Whether or not one subscribes to this general approach--and clearly, we do not--it must be granted that aspects of these questions can be stated in sufficiently precise terms to be amenable to empirical inquiry in the behaviorist mode: Can the desired behavior be shaped? Does the behavior transfer? Does the desired behavior last? Is it necessarily contingent on tangible rewards, or can it be brought under the control of less tangible rewards?

prove optimally efficient in a given situation, their use is justified (cf. Mahan, 1973). This formulation reflects the assumption that the technology as such is value-free, and precludes questions about wider ranging meanings of giving and receiving punishment in ongoing teaching-learning situations. With regard to decisions about objectives, behaviorist-educators seem to agree that learning should be transferable and durable, and that if at all possible, children should work for rewards like praise rather than for M&Ms. The fact is that anyone setting up an educational program--whether this is a comprehensive program or a circumscribed program component--cannot operate in terms of such limited objectives but is immediately involved in making higher-level (and more clearly value-laden) decisions concerning substantive aspects of the educational process. If behavior modification is the value-free technology it claims to be, it cannot provide guidelines here. The technologist-program-developer must seek an advisor who will define objectives, or go beyond his technologist role in establishing goals. An educational programmer is necessarily involved in delineating program objectives which are inherently, if not explicitly, tied to a broader educational ideology; furthermore, there is generally a strong interaction between selection of means and ends.

When we survey current programs in early education which draw on behavioristic psychology, and which generally make use of behavior-modification techniques (including the extension into setting up a token economy), we find that in fact these programs generally reflect adherence to highly traditional conceptions of the goals of education and of appropriate modes of conduct in the classroom, leading to an emphasis--at the preschool level--on circumscribed academic content and socially conforming behavior. The influential programs of Bereiter and Engelmann (1977) and Bushell (1973) stand as prime examples here. In our view, children in such classrooms are not only learning the specific skills and modes of conduct which are the "target behaviors" of the program, but are inevitably picking up other messages,

learning other things, as well. For example: That learning itself consists primarily in the acquisition of specific items of information, or highly specific procedures to be applied to given materials; that questions have specific answers which are right or wrong, and that knowledge of the correct answers (or, more explicitly, giving the correct response) is the path to success; that the path to success (and presumably to feelings of competence or self-worth) involves a straight line to the teacher or other authority who holds the key as to what is right or wrong, and dispenses the goodies when correct answers are forthcoming. If the teacher is not excessively authoritarian, he or she can be perceived as a harmless and pleasant game-player, a source of gratification to the child who makes discernible progress in mastering academic skills or controlling his socially unacceptable behavior. It seems that the child who is having difficulties is likely to learn that teachers are people who sometimes dispense punishment and very often leave one in a praiseless limbo to cope alone, people who cannot be counted on in times of need but only when one is "good." One works or behaves properly in order to achieve external rewards, at first tangible rewards like candy and/or the privilege of playing with a favorite toy or engaging in a preferred activity, and perhaps subsequently (if training is successful) to receive praise from some momentarily benevolent authority figure.

It seems to us that this kind of system must inevitably promote a dichotomy between work and play, or--more broadly--between doing something because one has to, and doing something because one wants to. The hidden assumption of the program-developers would seem to be that academic work or acceptable social conduct is not pleasurable in itself (except for the exceptional preschooler who can administer self-reinforcement); the system of dispensing rewards on a contingency basis serves --albeit unintentionally--to communicate this assumption to the children. Of

course, there is considerable evidence that certain kinds of academic tasks and social behaviors are indeed difficult and even distaseful to many children. In our view, this should lead to fundamental questions about the appropriateness and value of various learning-teaching situations for children of different ages, rather than to an emphasis on improving methods of shaping behavior. The underlying model for the token economy is the marketplace, where bartering--the buying and selling of goods and services--is the fundamental mode of transaction (Franklin and Franklin, in preparation). We believe that children being educated in classrooms based on this model must be learning that the ethics and modes of human conduct appropriate to the marketplace are appropriate modes for interpersonal interaction in the classroom, and perhaps in the world at large.

While denying that the technology of behavior modification is inherently bound to an underlying educational ideology, some behaviorists have recently stressed that the task of defining educational goals and values is indeed a serious one, demanding critical consideration. In a recent review entitled "Current Behavior Modification in the Classroom: Be Still, Be Quiet, Be Docile," Winett and Winkler (1972) deplore the fact that most current behavior modification programs, including those using a token economy model, reflect--in their choice of target behaviors--adherence to a highly traditional form of education. Their belief that this is a fortuitous rather than a necessary connection is underlined by O'Leary (1972) who argues that behavior modification has, in fact, been used in the ends of "innovative education." In a similar vein, Krasner and Krasner (1973) attempt to show that there is no conflict whatever between the use of behavior modification techniques (as used in a token economy) and the open classroom approach. We suggest, however, that the prevalent pattern is not merely fortuitous: The behavioristic method of technology requires analysis of input and output in discrete units, observable and measurable. (This is, in fact, its strength, particularly in assessing the effects of a given training procedure). This necessarily leads to a selection of

"target behaviors" that can be handled in such terms; it promotes an emphasis on product rather than process; on isolated responses or behaviors rather than on whole patterns within and across time periods; on forms of learning that are readily susceptible to quantitative measurement. Notions like "change in cognitive structure" or "increased self awareness" must be translated into behavioral terms and are severely distorted, even obliterated, in the process. This is no loss to the behaviorist whose epistemological framework does not require, or indeed allow, such concepts. And, as we suggested above, the circumscribed focus on pre-determined "target behaviors"--also stemming from the technological emphasis--is conducive to a neglect of "side effects," i.e., the other learnings that occur in the total context, and that may be equally or more significant in the long run. In any event, behavior modification is by its own claim a technology; as such, it provides a method of "teaching" and sets limits on the kinds of behaviors that can be taken as objectives in the educational process, but it provides no positive guidelines or implications with regard to broader objectives or goals. We have argued that the technology itself has value implications and that the sometimes hidden ideology of behavioristically-based programs is closely tied to the view of human nature, learning and development that is inherent in behavioristic psychology (cf. Kohlberg and Mayer, 1972).

The Piagetian Cognitive-Developmental Approach

The impact of Piagetian theory on the field of early childhood education has been one of the most striking developments of the past decade. Twenty years ago, Piaget was virtually ignored by mainstream American psychologists, and only a small group of educational theorists were concerned with the implications of Piagetian thinking for educational practice. In the past fifteen years or so, profound changes have occurred in the American psychological establishment. While behaviorism is still a strong force, few would deny that its all-powerful position has been weakened as cognitive-developmentalism has achieved greater prominence.

Stemming in part from these changes within the academy, there has been an upsurge of interest in explicating the implications of Piaget's thinking for educational programming (Schwebel and Raph, 1973; Furth, 1970; Overton, 1972) and the establishment of total preschool programs that view themselves as based on Piagetian thinking (Lavatelli, 1970; Weikart, 1971; Kamii, 1972; Kamii and Devries, 1973a). The influence of Piagetian formulations is also manifest in program planning within the British Infant School movement and some of the Open Classroom programs here and abroad that have evolved since the publication of the Plowden Report (1967).

Piaget never purported to be an educational theorist and has made clear that genetic epistomology rather than child psychology in a narrower sense is the thrust of his life's work. His own writings on education (1970) are relatively minor, and have only recently become available in America. It is clear that Piaget's work has strong implications for education, but the task of translating Piagetian thinking into educational practice involves considerable interpretation and decision-making. The differences among currently extant "Piaget-derived" curricula reflect the crucial role that curriculum developers play in bridging the gap between psychological theory per se and the specifics of educational practice (cf. Spodek, 1970).

An active organism view lies at the base of Piaget's approach. In this view, the organism is seen as the source of acts rather than a pawn pushed and pulled by the operation of external forces. The understanding and explanation of human behavior cannot be reduced to analysis of external conditions as causative, either in terms of a prior sequence of environmental events or in terms of present situation variables. Rather, one must focus on what the organism brings to the situation and how this enters into or governs his performance. Most important, what the organism brings to the situation is conceptualized in terms of underlying mental structures, rather than in terms of biologically defined proclivities (as in instinct theory), collections of stimulus-repsonse connections or propensities

to emit a given response under given conditions (as in behaviorism). Behavioral data are thus viewed as a basis for making inferences about the nature or status of underlying cognitive structures, not as the primary object or end of analysis. As physiological structures determine the types and range of stimulation to which an organism at any phylogenetic level is sensitive and thus its "effective environment," so psychological structures constitute the equipment through which the human organism "knows" his world, and govern his modes of transactions with the social and physical environment in which he lives. It is not necessary to posit any condition of need or deprivation, or of specific external stimulation as such, to account for the activation of structures. The functioning of structures is inherent to organic life; this is at the nexus of the "active organism" viewpoint. As already implied, the tenet of constructivism is intertwined with the active organism assumption. Basically, constructivism is the view that man creates his knowledge, that knowledge results from the transformation of material that occurs as psychological structures are brought to bear vis-a-vis the "materials" of the world.

Since learning is an active process, and knowledge is constructed rather than "acquired," the child must be provided with an environment which furthers his own natural tendency to act on and with objects, to explore, manipulate and experiment. He must be allowed, indeed encouraged, to take initiative, to pose problems and to generate solutions for himself, even where the problems may seem trivial to an adult and/or the solutions may be "wrong" from an adult point of view. The centrality of the organism's activity in his learning or development should not be interpreted to mean that mere physical activity is at issue, any more than the concept of the "active organism" implies an organism that is always moving around. Rather, it has to do with the idea that the child emergizes himself in a psychological sense (which may or may not involve overt action, depending on various factors including his stage of development) and directs himself towards the materials of his environment. In infancy, in the sensorimotor period, direct action on objects

is in fact important, for the child's schemes or psychological structures are organizations of action patterns which become differentiated, and further co-ordinated or integrated in the process of motoric activity, as he discovers the properties of objects and achieves some understanding of relationships through active manipulation of various materials. Such direct exploration and handling of objects is also important at the preschool level during the pre-operational period, where the child can see the effects of his actions as he handles and arranges materials in varying ways, and thus gains "physical knowledge" from observing the ways in which objects respond to various manipulations (e.g., dropping a crayon and seeing it break; dropping a metal rod and finding that it does not break), and "logico-mathematical knowledge" which is abstracted from the coordinations of actions themselves. However, at the preschool age, the child is already beginning to engage in mental activity where actual overt action may, at least in some cases, be abbreviated or non-observable as the child carries out internal rather than external actions--a development related to the advent of representational thought.

The traditional approach[7]--so evident in many behavioristically oriented classrooms--of presenting circumscribed content to preschoolers, predetermining right and wrong answers, and reinforcing those which have been designated as "correct" by the teacher or program developer is not only fruitless but may be detrimental as it stifles the tendency of the child to move out into the world, to take initiative, to explore and discover for himself, and so may hinder rather than facilitate genuine cognitive advance by making the child relatively passive in relation to the outer world. That such methods work at all would, in Piaget's view, have much more to do with the inherent propensity of the child towards psychological activity, his tendency to create meaning or order out of chaos, than with the specific methods employed.

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7. Not to be confused with the child-centered approach.

In speaking of the teacher's role vis a vis the child's learning, Lavatelli (1970) has drawn the following implications for preschool education from the Piagetian framework: "The teacher's role is to stimulate and to guide, not to teach specific responses, not to tell the child the right answer, nor even to tell him when he is wrong. The teacher must have confidence in the child's ability to learn on his own. When he is wrong, she may ask questions or call attention to cues that he has missed so that he has more data to assimilate, but giving him the right answer will not convince the child. He must be convinced by his own actions" (p. 48).

Perhaps the best known--or, shall we say, the most widely assimilated--aspect of Piaget's theory is that which has to do with the four major stages of cognitive development: the sensori-motor, the intuitive or pre-operational, the concrete operational, and the formal operational. We cannot undertake here to review or discuss the stages per se; this has been done by Piaget (1950, 1969) himself in many places and by numerous interpreters of Piaget, including those specifically concerned with the educational implications of Piagetian theory (cf. Overton, 1972). We shall confine ourselves to a few general comments, and subsequently discuss how Piagetian stage theory has been used in the Weikart, Lavatelli, and Kamii programs.

Essentially, development is defined in this view as a series of sequential, ordered changes in the cognitive structures which constitute the human organism's knowing apparatus. As we have already said, these changes occur as a result of organism-environment interaction. A stage may be characterized as an internally organized or integrated group of cognitive structures. Each stage is built upon the previous one, and in this sense may be said to derive from it; thus, it is not possible to skip a stage in development. At the same time, each generic mode of thought or stage involves a fundamentally new organization into which previous

modes are heirarchically integrated, and therefore change is not merely quantitative (as in the behavioristic view) but qualitative. New structures cannot be reduced to (or fully explained by) earlier ones; they exhibit emergent properties.

With regard to education, the broad and yet profound implication of this view is that modes of thought are qualitatively different at various periods in the child's life, that children at different stages of development will therefore interpret and respond to external situations in qualitatively distinct ways and that relative consolidation of earlier modes of functioning provides the basis for developmentally more advanced modes. It follows that curricula should be "stage appropriate," i.e., that various components of the program should be designed with as full an awareness as is possible of the child's modes of functioning. The fact that the generic forms of cognitive structures and the sequence of stages are rooted in biologically-based proclivities (although not explained by them, as we have said before) means that there is some rough correspondence between age and stage. One can expect, for example, that preschool children are utilizing and developing cognitive structures that are profoundly different from those used by seven- and eight-year-olds. Since there is, however, no reason to expect a one-to-one correspondence between age and stage, or indeed that any individual child will show uniform cognitive functioning, teachers must have ways of assessing each child's modes of functioning in order to provide him with an optimal learning environment.

Thus far, we have indicated some of the general implications of Piagetian theory for education in the early years. Clearly, a theory of development is not in itself a theory of education: in the passage from theory to practice, differing interpreations and decisions are made. Now we briefly consider some of the commonalities and differences among three programs that have taken Piagetian theory as a basis for educational programming at the preschool level.

We have said that if one takes seriously the idea that the child is the agent of his own learning (i.e., accepts the active-organism-constructivist premise), then one of the central objectives of preschool education is to help the child to become as active a learner as possible, to provide conditions in which his natural powers can be exercised to full advantage. The three programs referred to are all very much concerned with the broad objective. In this connection, they have given careful attention to the types of materials to be included in preschool classrooms, to the kinds of activities that are likely to promote the child's taking an active stance vis a vis the environment, and to the role of the teacher as guide and stimulator rather than as transmitter of information.[8]

Accepting the 'active organism' tenet here involves rejection of traditional methods of teaching in which the child is treated as a passive recipient of "knowledge." But acceptance of this tenet does not provide specification of what constitutes the optimal degree of structure and direct instruction in the learning environment, the appropriate balance between relying on the child's self-initiated action and directly stimulating or leading him to engage in given activities. In this regard, there are marked differences among Piaget-based programs, with Lavatelli's program emphasizing structured training sessions on classification, seriation, and number concepts as a supplement to less structured classroom activity, and Kamii (1973) arguing that genuine learning must occur in context and so should not be programmed as training sessions at the preschool level. The Weikart program seems to take a middle line here, involving considerable use of relatively circumscribed,

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8. The objective at issue here is very close to that espoused by the so-called child-centered programs. It is not surprising, therefore, to find that in promoting this objective, Piagetian curriculum developers have drawn on designs for classrooms, aspects of curricula, and methods of teaching developed earlier by those in the child-centered tradition.

structured, teacher-directed activities within the overall program (e.g., the use of specific games to teach color, size and shape awareness, with the teacher giving directions--"put together the dominoes that are the same color"--and requiring specific kinds of activities and verbalizations from the child in response, e.g., arranging items by size, shape or color and verbalizing the basis for the grouping).

There are considerable differences among programs in the use of Piagetian stage theory. At the heart of the Weikart program lies a concept of stages in representational functioning as stages of development which draws on Piaget's work (1951) but nonetheless constitutes a radical departure from Piagetian theory as we understand it. In line with Piagetian thinking, Weikart suggests that the young child acts directly on and with objects and then progresses to "representational thought." And within representational thought, Weikart then demarcates the following "stages": (a) the index level of representation where parts of objects or aspects of situations are taken as indicative of other aspects of the whole (as when the duck's footprints are taken as "representative" of the presence of a duck); (b) the symbol level of representation where body gesture and other forms (objects, clay models, pictures, etc.) which resemble (or are iconic to) other entities are interpreted as referring to them; and (c) the sign level of representation where forms--primarily words--which have no intrinsic relation of resemblance to their referents are understood as having a representational, referring function. The distinctions between index, symbol, and sign are Piaget's, but Piaget considers indexical functioning to be pre-representational, and--more important--he does not draw an alignment between changes in representational functioning and stage-characteristic cognitive structures as Weikart has done. This is not to deny that Piaget has stressed the significance of the advent of "representational thought," occurring towards the close of the sensori-motor period, and the emergence

of a symbolic capacity which is intimately related to the child's developing ability to represent non-present "reality" to himself. For Piaget, however, stages of cognitive functioning are differentiated in terms of types of mental operations which are ways of organizing experience and not modes of representation. Weikart's scheme would seem to owe more to Bruner's (1966) conceptualization of enactive, iconic, and symbolic modes of representation than to Piaget.

In any event, the theoretical emphasis on representational functioning in Weikart's program leads to close consideration, on the implementation level, of the specific types of materials, child-initiated activity (including socio-dramatic play) and teacher guidance that are conducive to the consolidation and further growth of the child's representational competence. The aim of the Weikart program would seem to be to facilitate the child's movement towards progressively "higher" levels of representation in relation to the shift from predominantly motoric to predominantly verbal modes of functioning, with attention devoted to the four content areas of classification, seriation, temporal relations and spatial relations. As indicated, there is a cognitive-stage-theory base here; the focus on representational functioning is consonant with the general cognitive-developmental perspective (Franklin, 1973; Sigel, 1972b). But the program does not attempt to follow Piaget in a rigorous fashion, particularly with regard to the concept of "higher" and "lower" levels of cognitive functioning and the related emphasis on verbalization and language training at what are deemed appropriate junctures. In fact, certain emphases within the program--for example, the emphasis on reinforcing concepts through repetition of their names, on "labeling," "verbal stimulation" and "verbal bombardment"--belie a consistent adherence to the implications of cognitive developmental theory.

By contrast, Lavatelli and Kamii not only adhere to the general implications of cognitive stage theory, but draw systematically on Piaget's study of thinking

during the pre-operational period as a base for curriculum planning. Both programs emphasize the importance of play as an area of activity where the pre-operational child spontaneously utilizes and so further develops his myriad, stage-characteristic cognitive capacities. These programs also reflect careful attention to the sequential developments within the specific areas of classification, seriation, number and space concepts--as Piaget has described them. Lavatelli's program includes as an important component structured training sessions (modeled on the tasks Piaget designed to investigate the development of logical thought), many of them apparently designed to teach concrete operations to the presumably pre-operational child. According to Kamii (1973b), this represents a misapplication of Piagetian theory: (a) pre-operational children should not be prematurely pushed through training, towards the concrete operational stage; (b) logical thinking should not be artificially separated from the development of physical knowledge, as occurs when such focused training sessions are established; and (c) classification, seriation, etc., cannot be thought of, and should not be taught, as separate skills, or indeed as skills in any sense of the term.

Kamii seems to have gone more deeply into Piagetian theory as a total system than has Weikart or Lavatelli, and in this process has come to a different group of specific objectives with regard to the education of the preschool child. The cognitive objectives of the program concern physical and social as well as logico-mathematical knowledge, at levels appropriate to the pre-operational child, and are seen as linked to socio-emotional objectives which encompass the encouragement of curiosity, confidence, and creativity. In the most recent formulations by Kamii (1973a&b) and Kamii and Devries (1973a), it is suggested that these objectives can best be realized in a program design which is very close to that of the so-called "traditional" or child-centered preschool. The difference, supposedly, rests on the more coherent, Piaget-derived, rationale which promises a more systematic approach to understanding and working with young children.

We see, then, that the programs which draw on Piaget differ in the specific use of this theory as a rationale for preschool education but share adherence to general implications of the cognitive-development perspective and a focus on promoting cognitive growth in the preschool years. These programs reflect similar values in their explicit effort--on the level of implementation--to foster the child's sense of himself as an autonomous learner, a questioner, an explorer, a problem-solver; his sense of the teacher as a guide, helper and source of useful information rather than an authoritarian figure dispensing praise and blame for right and wrong ansers; his sense of school as a democratic social system where exchange with peers is as highly valued as any other endeavor. To our view, the dramatic contrast with the "hidden message" of behavioristically-oriented programs is evident, and we see this as stemming from fundamentally different educational ideologies which are, in turn, linked to the different views of human nature and functioning underlying the two psychological theories at issue.

In significant ways, the value orientation and therefore the particular learning environments established for children in these Piaget-based programs are similar to those of the "child-centered" programs which owe a great deal, in terms of their origins, to the work of John Dewey as well to the influence of psychodynamic theory (cf. next section). Furthermore, among those who turn to Piagetian theory as a basis for preschool planning, there seems to be increased emphasis on considering the "whole child" rather than on focusing, in a narrower way, on cognitive development per se. Writing on Piaget's theory in relation to education, Overton (1972) has said that "the development of thought is not viewed as a process isolated from the total development of the child, but rather as a process integrated throughout with the child's interests and values, moral feelings, interpersonal emotions, and most generally his personality" (p. 95). In successive formulations of long-range and short-term objectives, Kamii has increasingly stressed the importance of

"socio-emotional" functioning and development in relationship to cognitive growth. However, the fact remains that Piaget's theory deals to a very large extent with the evolution of cognitive structures and provides relatively little of a substantive nature concerning other related aspects of development. One might say that in developing programs which are geared towards the child's total development, Piagetian program planners have gone outside or beyond Piagetian theory, formulating objectives and related modes of implementation which are consonant with the Piagetian perspective but not based on Piagetian theory as such. Kohlberg and Mayer (1972), for example, remark that "attainment of Piagetian cognitive stage is a necessary but not sufficient condition for attainment of the parallel ego stage"(p. 491) and suggest that a "general concept of ego development" is important to delineating broad educational objectives. To what extent the Piaget-based programs actually constitute comprehensive programs which have as their focus the "whole child" and take into account the subtleties of socio-emotional development cannot be adequately judged from the literature. However, the program descriptions reflect--to varying degrees, to be sure--a rather preponderant emphasis on cognitive functioning as such, and insufficient attention in our view to feelings and fantasy as they reflect and feed into the child's aesthetic as well as his inter- and intra-personal development.

The Developmental-Interaction Approach

There is a large measure of common ground between the programs based on this approach and those that adhere more exclusively to cognitive theories of development. But the difference between them is crucial to the planning of learning experiences, the teaching strategies and the nature of the teacher-child relationships. Essentially, proponents of this approach take the position that, while cognitive-developmental theory is a valuable component for the construction of an educational design it is not, by itself, sufficiently comprehensive to serve as the foundation for the totality of the educative process.

The developmental-interaction approach utilizes two major stage formulations of the developmental sequence: the cognitive-developmental, drawing on Werner (1940, 1957) as much as Piaget, and the framework developed within ego psychology, most specifically by Erikson (1950, 1959). From the perspective of cognitive development the maturation of the child is seen as a series of changing ways of gaining and organizing his knowledge of the universe of things, people and ideas. In general terms--the world he first knows through his senses and his physical-motor maneuvers is fundamentally altered when he can deal symbolically, through verbal and nonverbal modes, with his experience. During the next period, the pre-school years and first primary years, he becomes a primitive conceptualizer, ordering the complexity of his experience by comparing, grouping, classifying numbering, and postulating causality but the elements of these processes are still much influenced by perceptual factors, coexistence in time and space and more importantly by a lingering egocentricism in which self-feelings and wishes influence the contours of the child's image of the world. Not until the middle years of childhood does his conceptualizing become more objective, adhering to logical rules so that he can think in categorical terms independent of perceptual attributes, master concepts by delineating constancies in the object world, deal with multiple classifications as he becomes aware of relativity of class membership of a given item.

In the second formulation, successive stages of development are characterized as generalized affective-social patterns, comprising the whole complex of self-feeling and self-image, of attitudes and images toward others and of the style of individual functioning in relation to the opportunities and expectations of a given society. In this perspective, these phases of psychosocial development are closely related to phases of psychosexual epigenesis and reflect the basic conflictual nature of the maturing process--both the conflicting impulses within the self and the struggle between self-generated impulses and the demands of reality outside the self. The stages are defined as polarities--alternative resolutions

of the basic conflicts. The relative health of these resolutions is determined by the quality of interaction with the salient figures in the child's life and compatibility with cultural ideals. Thus, looking at functional outcomes rather than the particular organically-based conflicts or developmental tasks to be solved in successive stages, the stepping stones to healthy personality development spanning the preschool years have been defined as: a sense of trustfulness in others and trustworthiness in one's self; a sense of autonomy through making choices and exercising control; a sense of initiative expressed in a variety of making, doing and playing activities in cooperation with others and in imagined projection of the adult sex role.

Both of these developmental theories assume basic organismic functions which are operative across the life-span, and an invariant sequence of stages in development; in this respect they are "maturational" theories, rooted in metaphors of biological growth. But at the core, they are both interactionist theories, claiming that the development of stage-specific structures and functions, as well as movement from one stage to the next--i.e., development itself--occurs as a function or organism-environment interaction, the reciprocal interplay between the organism's propensities and activities and that which impinges on him from outside, the environment.[9] It is a premise of the developmental-interaction view here under discussion

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9. In general, cognitive-developmental theorists have focused on interindividual and cross-cultural commonalities in human functioning, emphasizing universal forms of thought and the universal stage sequence. While recognizing that progression through the stages can be hastened or slowed down by environmental factors, and that there are differences in the extent and use of the cognitive repertoire (and thus in the total adaptational status of the individual), these theorists have not been primarily concerned with variations in cognition functioning as a function of variations in environment. By contrast, in the sequence of generalized affective-social patterns (Erikson's developmental stages), environmental forces--family, school, subculture--are seen as moving in qualitatively different directions toward contrasting kinds of personality formation.

that the separation of these major developmental sequences--the cognitive-intellectual and the affective-social--has important heuristic value but that, in utilizing these formulations in connection with educational planning, it is essential to be continuously cognizant of their interdependence in the way children and people actually function. Cognitive-intellectual and affective-social processes are sometimes seen as constituting parallel and partly overlapping systems. This general position--moving towards an integrative formulation--is exemplified in Kohlberg's (1971) recent discussions of moral development. Thinking in terms of parallel systems can, however, lead to a dichotomous formulation, where changes in one system are seen as primary or causative, even to the extent of constituting the necessary and sufficient conditions for changes in the other (e.g., if cognitive development is proceeding well, the child will naturally have positive feelings of self-worth in other domains). Actually, the loading of curriculum designs is influenced directly or indirectly by the position taken with respect to these theoretical alternatives: the primacy of one system rather than the other--or, the third alternative, a genuinely integrative interactionist view (c.f. Mayer, 1971).

Integrative formulations appear in other psychological domains. Creativity has been conceived as a synthesis of various modes of intellectual functioning including divergent thinking, transformation processes, sensing ambiguity, perceiving patterns and "playing" with ideas as well as logical thinking. By this view, creativity depends also on closeness to experiences of the inner life that underly motivation and the affective-social patterns of the personality (McKinnon, 1972; Barron, 1969; Murphy, 1964). In a more clinically oriented schema, the course of ego development is formulated in terms of the interdependency of impulse control and character development, interpersonal style and conscious preoccupation including self-concept (Loevinger, 1966).

In the realm of educational thinking the thesis of cognitive-affective interaction has taken various, complementary forms. In one formulation, emphasis is on the concept that knowledge is bound as cognitive-affective interactions. Competence in creative and communicative use of symbols is regarded as essential to support of the major ego processes; ultimately an integrated orchestration of emotions, skills, knowledge, thoughts, imagination becomes available for interaction with the environment (Bower, 1967). In a similar context, a theory of instruction points to the loss to the intrinsic learning process when emotional responses aroused by a learning experience are not dealt with openly, shared by the children as a group, channeled toward symbolic, representational expression and understood as integral counterparts to the cognitive elements (Jones, 1968). The same thesis is developed in a study of play fantasies in children illustrating, for example, how the quality of early representations of the self bespeaks both cognitive achievement in self-differentiation and the sense of a good or bad self established as outcome of earliest experiences with need, fulfillment and denial (Gould, 1972).

The developmental-interaction approach, as it has evolved at the Bank Street College of Education, over half a century, had its roots in the progressive education movement (Biber, in press).[10] In that era, as in our own, it was expected that innovation in education could correct basic faults in our democratic society. What was needed was a totally different life of learning for children, one that would correct for the conformism and authoritarianism that characterized the Zeitgeist and was reflected in the school. In contrast to "compensatory" programs (which also aim to correct for basic faults through educational innovation) the goals of the earlier experiments embraced educational programs as total ideologies and the children as "whole" individuals (Biber, 1972).

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10. Certain similarities in goals and implementation have been pointed out between the Bank Street approach and the advisory system of the Educational Development Corporation based on the British Infant School movement (Gordon, 1972).

A radically altered learning environment, new instructional strategies and curricula were developed by educators in accord with Dewey's theories of experiential learning. They sought to implement his major tenets: the child learns through his own active involvement and through interaction with the phenomena of things, people and ideas in his environment; there is continuously a process of "collateral" learning, the formation of attitudes that are both emotional and intellectual and govern the development of basic systems of preference and aversion. In Dewey's words (J. Dewey and E. Dewey, 1915): "The greatest of all pedagogical fallacies is the notion that a person learns only the particular thing he is studying at the time."

This basic educational ideology was developed and refined over a period of six decades. Changes evolved through informal and formal modes of experimentation and revision, based on the observations and insights of the educators working directly with the children. The outstanding thinkers in this group were Mitchell (1934), Johnson (1928), and Pratt (1948). Among their special curriculum contributions can be mentioned the development of an intentionally comprehensive educational design for the years following infancy, the utilization of spontaneous play as a tool for learning suited to the idiom of early childhood and a method for the study of environment in which a cognitive search for relationships is the basis for formulating general principles.

Historically, there is a complex relation between what was happening in those years on the educational front and the advances in the knowledge of human functioning represented in the work of developmental psychologists, in psychodynamic formulations and the principles of preventive mental health. From one perspective, the contribution of these psychological schools of thought can be looked at as a validation of principles derived from an experiential base by educators who observed and theorized as part of their professional function. A more dynamic interpretation is probably closer to the truth. The educators, committed to building educational

practice on a rationale of child development research and theory, sought and found in the contributions of these psychologists not only a congruent view but also refreshment and stimulation for further change in practice. The evolution of the developmental-interaction view represents the progressing integration of both these streams of thought and experience.

In the developmental-interaction approach the inseparability of cognitive-affective processes governs the suitability of teaching methods (Biber, 1967). The possible merit of a technique is weighed in terms of multiple possible effects. Thus, learning experiences designed to further cognitive facility are weighed in terms of the simultaneous learning that is going on with respect to self-feeling, attitudes toward others, work patterns or general behavioral modes (Dewey, 1938). Practically, this calls for paying close attention to side effects as well as target success in any intentional teaching strategy and, finally, screening both orders of outcome on the basis of pre-established values.

Side effects sometimes supply a positive increment. Thus, in a given story, the teacher may find material for a target in the cognitive domain--mastery of concepts of multiple roles, for example. If she takes time and makes room for one of the children to enlighten the others from her own experience (her father is a fireman), she is simultaneously serving a goal in the non-cognitive sphere, namely, to help children establish mutually supporting roles and see each other, as well as the teacher, as sources of information (Biber, Shapiro, and Wickens, 1971). Alternatively, restricted attention to a target goal may have negative outcomes. The teacher who responds to a child's drawing by pointing out a disparity in size relations and suggests that the child adhere more closely to external reality is violating one of the essential processes by which children achieve a strong sense of self--namely, to have their creative products accepted and recognized as the end

of an integrative process in which they, as individuals, find symbolic ways of dealing with both the logical and alogical aspects of their experience.

The curriculum design for this approach incorporates the educationally relevant precepts of cognitive-developmental and ego psychology theory. It takes the view that children are basically curious and impelled to make an impact on their environment; that they are equipped with autonomous ego functioning independent of instinctual drives. Learning takes place through action--concrete and conceptual--and interaction with the objects, people and ideas of the environment (White, 1963). Knowledge is gained and adaptive patterns established through exploration, manipulation and investigation. Productive, creative use of knowledge is maximized when there is opportunity for representational re-interpretation of experience (Franklin, 1973). The definition and quality of the interpersonal relations--teacher-to-child and child-to-child affect and are affected by affective-social patterns. Matching curriculum designs and the learning atmosphere to successive developmental stages takes into account both level of cognitive functioning and stage-specific psycho-social characteristics, drives and conflicts (Biber, 1967). Motivation to learn is regenerated by satisfied curiosity, the pleasures and intrinsic rewards of mastery, identification with teacher figures and the internalizations of the trusted adults' confidence in the child's competence.

These general precepts about the course and the process of development influence the teacher's perception of the child as an individual. The child is not expected to function consistently at a given developmental level. Earlier forms of thinking, expression and adaptation continue to appear even when his predominant response patterns have become more advanced. From the viewpoint of creativity, having a varied repertoire, being able to continue to use the more primitive forms is seen as an advantage (Werner, 1957). It is expected that periods of instability

are likely to alternate with other periods in which skills, feelings, action patterns support each other and yield highly integrated behavioral outcome (Biber and Franklin, 1967). It is important, therefore, that the teacher can perceive periods of "regression" or "disturbance" when they occur as being, possibly, part of the complex phenomenon of development and not necessarily an expression of emotional disorganization.

The purview of a child's individuality includes, in addition to the behavioral picture, awareness of the inner processes through which self image evolves. This asks that the teacher differentiate the elements in the learning environment in terms of how they may influence the child's own assessment of his skills, the clarity of his social-sex role, his sense of himself as a learner, and his store of courage and know-how for coping with difficulty. The teacher knows and communicates with the child as a particular person. She is aware of his strengths, difficulties and desires and these are open between them. This is the more possible to the extent that the teacher has absorbed the precepts of the interaction of cognitive-intellectual and affective-social processes.

Ideally, in these classrooms, as in cognitive-oriented programs, children are actively engaged in exploring their environment and sharing their experience in an atmosphere where questioning, searching and problem-solving are encouraged (and there is no embarrassment about not knowing, among children or between children and teachers). The aim is to provide an abundance of experience and encounter, a variety of situations to which the children need to adapt, plenty of alternatives from which to make choices and an appropriate set-up for self-initiated exploratory play. Direct contact with phenomena and people takes priority over the vicarious; the salient situations for learning are outside the classroom as well as inside.

Here, in contrast to the emphasis on structured lessons which are prominent is most programs where cognition is the primary focus, the instructional method is weighted toward making maximal use of the children's varied, ongoing experience, as it transpires, as the prime material for stimulating cognitive processes. When it is successful, this method produces a pervasive climate of why, wherefore and wherefrom kind of thinking. The teacher uses every appropriate opportunity to stimulate differentiated observation and comparison, to encourage the search for causes and origins, to bring the orderly passing of time, the contour of spatial reality and the transformations of growth to awareness (Biber, Shapiro, and Wickens, 1971). This occurs in innumerable contexts: in recognizing the separate series of landmarks that distinguish different routes to the play roof; in recording the successive weights of the growing gerbil; in using the known sequence of the schedule of activities to predict what is coming; in exploring the building to find where the heat in the radiators comes from.

The teacher uses various ways of stimulating thinking at appropriate moments. She helps elaborate a child's experience through verbal expression, she rephrases a child's expressed thought or action in a way that lifts the level from particularized performance to a more generalized concept; she offers material for analogous thinking; she puts questions that stimulate perceptual and conceptual search manoeuvers. In the course of story-reading, she opens up questions for later pursuit that are a little ahead of the childrens' thinking level. In instances of social dilemma, she unravels the elements of difficulty and helps the child compose a possible solution to the problem. She stimulates anticipatory thinking by posing if-then formulations.

As part of the program design the teacher takes initiative from time to time in introducing certain pre-planned learning episodes focused on clarifying specific concepts--similarity, difference, size, part-whole, etc.--using objects and events

that are experientially familiar to the children. Also, the classroom is so organized-spatially and functionally-that cognitive functions such as sorting, classification, recognition of written symbols are practiced incidental to daily classroom functioning. Structured learning episodes in the realm of cognition during the early years of childhood are only supplementary to the context--embedded methods for stimulating conceptual organization.

In line with the importance attached to cognitive-affective interaction, the program is designed to nurture the intuitive processes, the capacity for feeling and emotion, for reflective as well as goal-directed thinking in order to bring the totality of imaginative, productive functioning to its highest power. One of the established goals, "to increase the range and depth of childrens' sensitivity to the world around them" (Biber, 1967), has aesthetic components as well.

This view dictates the importance of giving expressive activities an important place in the curriculum. The children are provided with ample opportunity, equipment and encouragement for many forms of symbolic expression, verbal and nonverbal, for reliving experience by representing it in personally-meaningful terms, for fantasying as well as reasoning, for synthesizing the subjective and objective aspects of experience. Their activities in this domain are free from any restraints of imposed standards for duplicating reality or adhering consistently to the relations implicit in logical organization.

The method used for stimulating and enriching spontaneous dramatic play of young children has been highly developed in this program. The teacher observes, provides materials or a few extensions of ideas, perhaps takes a passing role in the play temporarily but she does not teach how to play. This kind of spontaneous play, originating in the self-determined conceptualization and enactment of the children, individually or in small groups, serves dual functions. It is recognized as an important learning mode for this stage of development--a medium for externalizing thought in which the child gains new cognitive mastery over nascent conceptual

content. It is equally important as experience in which the wondering, problem-solving and conceptualizing of the groping child mind fuses with the wishes, fears, longings for strength, pleasures, pains of the forming inner self--in other words, a self-initiated creative process in which the child integrates his understanding of objective reality with his personal meanings and feelings.

Still other techniques are involved in supporting the children's interactions with each other and helping them to function as a group. In the way the children's joint play and activities are organized, in the issues considered crucial in settling disputes, in the guidance for how and when to listen and be heard in a group discussion, the teacher establishes mores of social interchange--ones that maximizes the children's learning from each other and offers guidelines for the socializing experience of cooperating, helping, consoling or coping with disagreement and conflict of interest. In this setting, the child finds himself in a learning environment in which he is a major actor--so organized that he can gain a sense of his own competence through the experience of autonomy--selecting, planning, initiating, decision-making. His ways of transforming and reconstructing experiences are valued for aesthetic qualities and expression of feeling as well as for evidence of cognitive mastery. There is a wide latitude for varied personal interaction on many levels since the social climate is not rigidly stratified between stronger and weaker, knowing and not knowing, adult and child. The teacher is looked to not only as a guide for penetrating the how and why of the external surround but also as a willing, dependable resource for dealing with fear, loss of direction, anger or loneliness when there is hurt and with a sense of justice when there is controversy. When it is successful, the child finds strength and pleasure in creating order through his expanding thought processes, from sharing depth of feeling with teachers and children and from recreating symbolically the meanings--real and fantasied--that are of the greatest moment to him.

As has been indicated earlier, the teacher carries a complex role in the imple-

mentation of this ideology. Her interactions with the children cannot be standardized; she has to be sensitive and adaptive to the simultaneity of thinking and feeling processes. As in the cognitive-oriented programs, she needs to be able to assess the level and the pattern of the child's cognitive functioning; here, she needs, equally, to be aware of how stage-specific social-emotional drives and conflicts are being worked through by the individual child. The teacher seeks to understand and respond to the child's meanings and feelings in whatever way they are communicated. The lack of standardization like the requirements for awareness and responsivity makes the teacher's role challenging but often very difficult. Perhaps more than in other programs, successful realization of educational goals depends upon the teacher's ability to take genuine initiative in translating basic precepts into a productive learning environment. The unusually complex requirements of the teacher's role constitutes a challenge to teacher education not readily met within the framework of most teacher education programs.

Final considerations

Certain primary questions--they can be called issues since they arouse considerable controversy among proponents of different views--have surfaced in the course of this brief account of three approaches to programming in early childhood education (i.e., the behavioristic-learning-theory approach; the Piagetian-cognitive-developmental approach; and the developmental-interaction approach). A central question is: What place does psychological theory have in relation to educational planning? Since education revolves around modes of guiding and channeling the processes of learning--and, more broadly, development--sound procedure requires that it turn to psychological theory for conceptualization of these processes. But more than "translation" is involved in the application of psychological theory to the educational domain. It is clear that educational practice--at whatever level--involves an ideology concerning a system of values for human functioning, and a strategy of implementation geared toward the achievement of selected goals.

Here we may focus on the question: To what extent does adherence to a given psychological theory as the basis of an educational design restrict the comprehensiveness of the program--the extent to which it provides for the multiple aspects of learning, ego development and socialization?

Of the three approaches, behavioristic learning theory appears to be the most limiting when applied to education, generating a technology geared to behavioral change in circumscribed areas. The mechanisms involved turn out to be--though presumably without intention--matched to the philosophy and limited goals of traditional education. Specifically, the role of the child to adult, of learner to teacher, inherent in the teaching techniques derived from behavioristic learning theory match the quality of these relationships inherent in traditional educational philosophy.

By contrast, the psychological territory of cognitive-developmental theory is far more extensive. The explanatory concepts in this theory contribute to a complex, internally consistent image of learning and growth, not in terms of behavioral change per se, but with reference to an active organism, constructing knowledge of the world around him through interaction. In application to education, this theory dictates responsibility for a comprehensive program with specific criteria for suitable environmental input, and for the nature of interaction between child and adult. Nevertheless, as we have argued, the focus on cognitive processes is a limiting perspective: the sphere of affective-social patterns is not a fully developed aspect of this theory. Even though there is, recently, recognition by some curriculum-planners of this school that cognitive processes cannot be supported and stimulated without consideration of concomitant social emotional processes, the cognitive-developmental theory does not itself provide guidelines for the design of this aspect of the learning environment.

In passing we may note that application of another perspective--classical Freudian theory--can have and has had a similar restricting effect on the construction of a comprehensive learning environment. In this instance it is the cognitive processes that take a peripheral position in relation to the psychodynamic forces at the center.

The developmental-interaction approach is a "whole" child approach. Educationally, its goals comprise affective-social as well as cognitive aspects of development. The question of priority on (or, whether) which stands at center and which at periphery is irrelevant since the primary thesis is that both these domains of psychological functioning are continuously interactive. This view dictates the most comprehensive program planning of a learning environment with specific guidelines as to the varieties of learning experience and the consideration of teacher-child interactions both in general overall terms and in the choice of focus in the particular moment-by-moment exchanges between teacher and child.

As has already been indicated, no one developmental theory stands as adequate rationale for this approach. Both cognitive and affective-social theories are requisite as foundation for the enactment of the educational philosophy which shares certain basic values with the cognitive-developmental approach but includes concepts of healthy personality derived from psychodynamic theories.

The reference to two lines of theorizing as foundation for an educational program, brings a question--an issue--to the fore that is especially pertinent to the general implementation of theory in programming. The attempt to draw on multiple theoretical sources sometimes leads to a patchwork--matching parts of educational practice to this or that theory--and this, in fact, characterizes many programs which have not been dealt with in this presentation. By contrast, in the developmental-interaction approach, an integrative theoretical view has been developed which governs overall decision making as well as the continuous interactional modes.

It is in this connection that the important issue of target and side effects has been raised in the previous discussion. The position has been taken that target-focused techniques inevitably have side effects and that limited theoretical foundations, most extreme in the behaviorist view, leads to neglect of the totality of input, and, consequently, lack of awareness of the complexity of what is internalized by the child. With all too brief illustrations we have attempted to indicate the implicit decision-making going on in a teacher's mind as she shapes her interactions with the children. At this point, perhaps it should be reiterated that excellence in enacting this educational role is not readily come by--and involves a special kind of teacher preparation.

What do we see as feedback from the psychologists' involvement in education especially as concerns the problem of evaluation? For many this is a period of "second thoughts" fed from several sources. In recent critiques of what has been lacking in past studies, we see increased awareness of the complexity of dealing with the varied, interdependent processes of classroom life (Sigel, 1972a; Soar and Soar, 1972; Messick and Barrows, 1972). Shapiro (1973) says, "The parameters of variation cannot be simply boxed in with notations of geography and ethnicity. Nevertheless, one finds few, if any, descriptive or analytic accounts of the educational transactions that take place in the schools or centers under study." Reviews of the literature point to a dearth of studies dealing with the components of classroom situations. The plea, in Shulman's words, is that the language of education and the behavioral sciences develop "a set of terms for describing environments that is as articulated, specific and functional as those already possessed for characterizing individuals" (Shulman, 1970).

One effort to do this appears in the study on the impact of school experience by Minuchin, et al. (1969), which provided full descriptions for four qualitatively

different school environments. What we see now is increased attention to the need for developing methods of analyzing learning environments, taking the total complexity into account before initiating specific innovative practices.

The outcomes of innovative programs developed by psychologists have been measured systematically. When outcomes are not in accord with expectations--as has been the case for many preschool and elementary school projects--various post hoc interpretations are offered. It has been said that program differences do not come through because teachers did not know how to implement the method, or did not understand the rationale behind it, or--even more seriously--effective use of the method required basic changes in the teacher's attitudes and perception of children and the learning process. In some comparative studies, the quality of teacher functioning and commitment loom large, emerging as more salient than differences in instructional method per se (Weikart, 1969). Sometimes the underlying theoretical rationale is questioned or even indicted in the process of interpreting findings--for example, where one developmental process was considered in isolation with sufficient attention given to questions of interaction. Still another kind of post hoc inference points to the importance of long periods of continuous implementation prior to final assessment of outcomes. This last was one of the prime factors in the establishment of Follow Through as a sequel to Head Start.

When one embarks on reconsideration of causal variables, one also becomes involved in evaluating the evaluation or outcome-measurement process. Recently, there has been considerable criticism of the more standard evaluation techniques (Shapiro, 1973; Fein and Clarke-Stewart, 1973; Eisner, 1972). This cannot be attributed entirely to feedback from psychologists plunging into the applied field of education, but it has had great impetus from the need to face the reality of what looks like failure in many applied programs. Conceivably, the concept and method of evaluation may be obscuring much of what is really happening and, if it

is, we have reason to be uncertain where the failure is--how much in the program and how much in the way of evaluating it. Zimiles (1970) points to the negative influence of inadequate assessment: "When the shortcomings of the evaluations themselves are glossed over and they are mistakenly presented as offering definitive statements regarding the nature of school influence, and the imperfect indices they use to achieve crude assessment themselves become the basis for school planning, then it is time to recognize that they have overstepped their bounds and begun to interfere with the very processes they were intended to support."

Several of the psychologists who have been close to the task of evaluating compensatory programs in early childhood share a common concern. In their view, the test procedures used to evaluate outcomes of programs are inadequate and often misleading. Such methods sample a very narrow range of a program's effects and are therefore best suited to the programs with the most limited goals. The nature of the test situation itself restricts and distorts the extent to which the child's responses are representative of his capabilities in other situations, particularly for the "disadvantaged" child.

Especially with regard to cognition, assessment strategies have been geared toward evaluating knowledge or capacities in a limited sense and have rarely provided sensitive indices of cognitive functioning. While the distinction between capacity per se and its functional significance has been noted for some time, this has not been given prime emphasis in the design of research. Recently, social concerns, developments in cognitive psychology and a new perspective in cross-cultural study have coalesced in the analysis of the relations between extent of cognitive repertoire and variations in modes of utilization (cf. Cole, Gay, Glick, and Sharp, 1971).

Evaluation would take a quite different perspective if the criterion of optimal cognitive functioning were not so restrictedly defined as the attainment of

the highest levels of logical thinking. Alternatively, one turns to Werner's conceptualization of optimal functioning which does not posit displacement of earlier by later, or of primitive by more advanced modes of thinking (Werner, 1957). Instead the movement from lesser to greater maturity is characterized by widening the range of developmentally different operations and thus making available different modes of structuring to be brought into play in any given situation.

These trends support process-oriented evaluation that does not assess outcome at some arbitrary endpoint but engages in intimate study of programs, documenting what is happening to children in the learning environment where there can be a full sampling of how the child is using his capacities in interaction with what a particular environment offers him. It has been called formative in distinction to summative evaluation (Scriven, 1972).

Perhaps we have come to the point where it is time to reject the all too persistent emphasis on acceleration and replace it with attention to extent of repertoire in both a functional and developmental context. There are clear implications for education as well as evaluation. Cole and Bruner (1972) suggest "The teacher should stop laboring under the impression that he must create new intellectual structures. He should start concentrating on how to get the child to transfer skills he already possesses to the task at hand...." To us, it would be preferable to say that the emphasis on abilities per se should give way to helping the child utilize all the modes of structuring his experience that he has achieved developmentally to serve a more varied range of pragmatic and creative ends.

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